

## Successful Heart-Lung Transplantation in Saudi Arabia: A Case Report

Yazeed Alrabah, MBBS<sup>1</sup> Sara Shafout, BSN<sup>2</sup> Mohannad Dawary, MBBS<sup>2</sup>  
Imran Nizmi, MD<sup>3</sup> Waleed Saleh, MD<sup>3</sup> Fareed Khouqeer, MD.

1.Imam university, Medical college, Riyadh, Saudi Arabia, 11432

2.Princess noura university, college of nursing, Riyadh, Saudi Arabia, 11671

2.Imam university, Medical college, Riyadh, Saudi Arabia, 11432

3.Department of thoracic surgery, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia, 52431

Department of cardiac surgery, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia, 11211

### Abstract

Heart-lung transplantation is a rare surgical option performed to replace both the heart and lungs in a single operation when other treatment options have failed. Here, we present a case report of heart-lung transplant operation performed on a 17-year-old male with complex congenital heart disease, pulmonary hypertension and heart failure with ejection fraction <25%. We also outline the operative indications, contraindications, prognosis, care of the patient and complications of heart-lung transplantation.

**Keywords:** Heart-lung transplantation; Indications ; Contraindications.

### Introduction

Heart-lung transplantation (HLT) is a major procedure performed to replace both the heart and lungs in patient with cardiopulmonary disease in a single operation (1). The first successful HLT was done in 1981. It has become an accepted therapy for patient with severe primary lung disease and progressive irreversible cardiac dysfunction when all other therapeutic options have failed (2).

Since 1986 the International Society for Heart and Lung Transplantation (ISHLT) report 660 pediatrics HLT and 3,755 adult HLTs (3,4). According to ISHLT, the major worldwide indications for HLT are congenital heart disease, pulmonary hypertension and cystic fibrosis when patients have life expectancy less than one year. Contraindications of this operation are severe end-organ Kidney diseases, liver diseases, HIV infection or malignancy (2).

According to Organ Procurement and Transplantation Network (OPTN), the HLT is performed on patient between age of 11 to 17-year-old (2). HLT patients have 63% survival rate at the first year. Furthermore, the median survival is 10 years for patient who survived the first year. Moreover, younger HLT patients tend to have higher survival and lower complications rates than older patients. Like other organ transplantation, HLT has high risk of graft failure and infection (5).

This report presents a case of young male with complex congenital heart disease and pulmonary hypertension who went through heart lung transplantation.

### Case Presentation

A 17-year-old male who was born with Patent ductus arterioles (PDA) and Ventricular septal defect (VSD) which was repaired surgically. A few years later patient needed pacemaker implantation due to complete heart block. Recently, the patient was diagnosed with pulmonary artery hypertension and Heart failure with reduced ejection fraction. On clinical examination, his Heart Rate was 77 per minutes, mean arterial pressure 51 mmHg and respiratory rate 24 breath per minute. The respiratory examination was clear to auscultation bilaterally and the cardiovascular auscultation detect that S1 and S2 were regular in rate and rhythm but there was a loud systolic murmur that can be heard all over the precordium. Electrocardiography showed normal sinus rhythm with a right bundle branch block pattern. The patient was on Bosentan, Digoxin, Enalapril, furosemide, Metolazone and Spironolactone. His blood type is B-positive. The transplantation committee listed the patient for HLT. After finding suitable donor, the patient was admitted and prepared for surgery. According to local transplant protocol, the patient received mycophenolate mofetil prior to going to operating room, methylprednisolone at the time of reperfusion of heart-lung block. Intravenous immunoglobulin was given pre-op and immediate post op for the presence of donor specific antibodies. antibiotics included vancomycin, meropenem and Colistimethate Sodium. The transplantation was complicated with bleeding. Multiple attempts resulted in control of bleeding with packing. As a consequence of that multiple packed blood products were transfused. Patient transferred to the Cardiac Surgical ICU with open chest and packing. The patient required return to operation room for hemostasis at the same night which was successful in controlling bleeding and the chest was closed without any packing. While he was in the ICU he developed respiratory infection *methicillin-resistant Staphylococcus aureus* (MRSA) and *multiple drug resistance* (MDR) pseudomonas. He was treated

with Tazocin, vancomycin and ciprofloxacin for 21 days upon the consultation of the infectious disease. Because of severe diarrhea, the Mycophenolate Mofetil was discontinued and replaced by azathioprine. Predischarge pulmonary function test revealed FEV1 1.97 and FVC 2.15

so he was discharged with the following medication: corticosteroids, Azathioprine, immunosuppressants, Amphotericin-B nebulization, Itraconazole, valganciclovir hydrochloride, Sulfamethoxazole, Trimethoprim, Magnesium oxide, Cholecalciferol, Omeprazole, Isoniazid, Linzolid, furosemide, Calcium, Pyridoxine.

### Discussion

HLT is a rare surgical option used to treat patients with end-stage cardiopulmonary disease in a single operation when other treatment options have failed (6). Congenital heart disease, Idiopathic pulmonary arterial hypertension (IPAH) and Cystic fibrosis are account for 77% of the major indications for adult HLT (5). In this patient, the indications for HLT was pulmonary artery hypertension secondary to congenital heart disease which are VSD and PDA. The patient has heart failure with severe dysfunction ejection fraction <25% as defined in American College of Cardiology (7). The patient was good candidate for HLT surgery and he went through successful operation. The leading causes of death during first 30 days after the operation are technical complications, graft failure, hemorrhage and infections (1). The survival rate after 3 months of operation 71 % according to ISHLT and get higher with younger patients (5). This patient was on Mycophenolate Mofetil which proved to reduce mortality and rejection in the first year after cardiac transplantation compared to azathioprine regarding to a randomized active-controlled trial but, unfortunately the patient suffered from severe diarrhea so, Mycophenolate Mofetil discontinued and replaced by azathioprine (9). Medical management of this patient in cardiac surgical ICU included keeping the patient's airway plateau pressure less than 30 cm H<sub>2</sub>O, the Central venous pressure (CVP) around 19-20 mmHg. checking on the patient arterial-blood gas (ABG) hourly, and the coagulation and complete blood count (CBC) every four hour. Urine output and chest drains were observed. The left ventricular ejection fraction improved to 55% post operatively. Dealing with young patients require constant attention and sympathy understanding of their needs and thoughts (10). Our team were keen to do that. For instance, the patient was careless with his appointments so sometimes the medical staff stayed late awaiting the patient to get his physical examination, but in spite of that, he never missed any of his appointments. Also, physicians often look at the wound in diagnostic-clinical contexts, whereas for the patient, the wound is something experienced and felt (11). The healthcare professionals educated and supported the transplant recipient and his family about the medical and psychosocial challenges that their son might experience.

### Conclusion

Heart-lung transplantation is a rare operation due to perioperative complexity and early complications of the procedure. It is used to treat people with Congenital heart disease and pulmonary arterial hypertension. The survival rate after three months of the surgery is 71 %. Excellent prognosis is expected in patients of younger age and with early management of complications.

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